Section 6.6

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1 Calibration of AGFA Monitors

1.1 Introduction

Basics

For the installation sites of monitors the conflict of high requirements on the viewing of light-reflecting as well as self-luminous objects must be solved. With an increasing light intensity the viewing of light-reflecting objects improves, however, viewing of self-luminous objects, e.g. monitors, gets worse. Therefore you should try to avoid too high ambient light and light reflections on the screen.

For optimum viewing conditions the defined ambient light intensity values in DIN 6868-57 are recommended (see table 1)

Viewing task	Max. luminous density for white light of the monitor (cd/m²)	Medium ambient light intensity in the center of the monitor (lx)
Diagnostics	100	≤ 10
Diagnostics	500	≤ 50

Table 1

If the ambient light intensity is higher than the recommended values, inform the customer about the bad viewing conditions and try together with your customer to find a way to reduce ambient light.

If this shouldn't be possible, the black level of the monitor has to be readjusted.
This means the contrast will be reduced due to the fact that the maximum luminous density of the monitor is fixed (300 cd/m^2 high-bright, 120 cd/m^2 standard-bright). As a result it will be more difficult to detect tiny image details on the monitor (see Figure 1, following page).

1.2 Measurement Procedures

Required tools for ambient light measurements and monitor calibrations:

- Light measuring tool, e.g. Mavo Digital Luminance Meter (Order No. CM+7.8966.1239.0), which is used in the following description.

To determine the actual ambient light intensity, put the ambient light sensor of the Mavo Digital Luminance meter in front of the monitor, pointing away from the screen. Be sure, that no items are affecting the measurement.

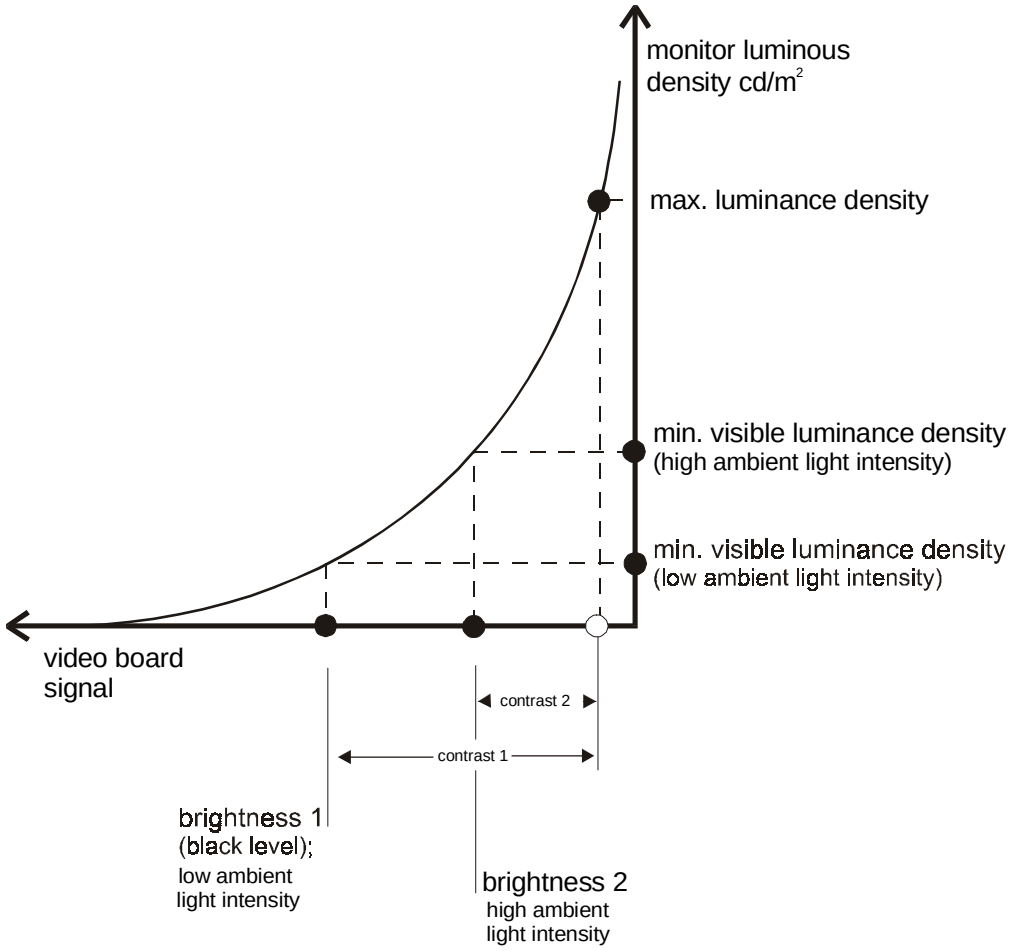


Figure 1

Dependence of brightness, contrast and monitor luminance density for a specific γ - monitor curve.

If you choose a luminance density exceeding 300 cd/m^2, the lifespan of the monitor will be reduced drastically.

1.3 Calibration of the AGFA High Brightness 1K/2K

This calibration procedure takes appr. 30 minutes.
Calibration of the monitor is to be checked during maintenance of the ADC System.

Requirements:

- AGFA High Brightness Monitor, Order No: EB+44060490 (with ambient light sensor).
- The monitor must be warmed up for at least 30 minutes.
- The monitor must be located and orientated where it will be used later.
- Ambient light as described in topic 1
- The ADC-Application must be running.
- Service PC with service software SM-Fit installed (available on Diginet).
- Light measuring tool, e.g. Mavo Digital Luminance Meter (Order No. CM+7.8966.1239.0), which is used in the following description. For different light measuring tools you have to proceed similar.
- Null-modem-cable (e.g. CM+9.9999.10180).
- Floppy drive, empty floppy disk
- Ruler (about 40 cm)

1.3.1 Overview

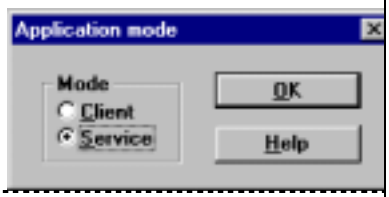
The calibration has to be done in 2 steps:

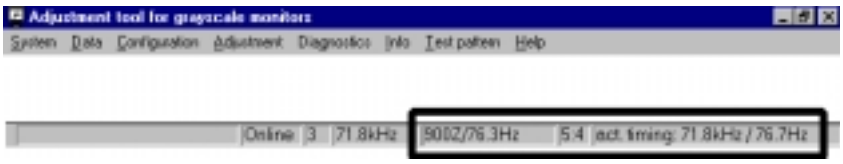
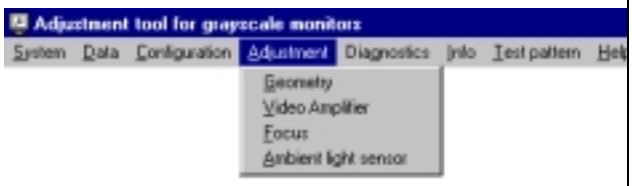
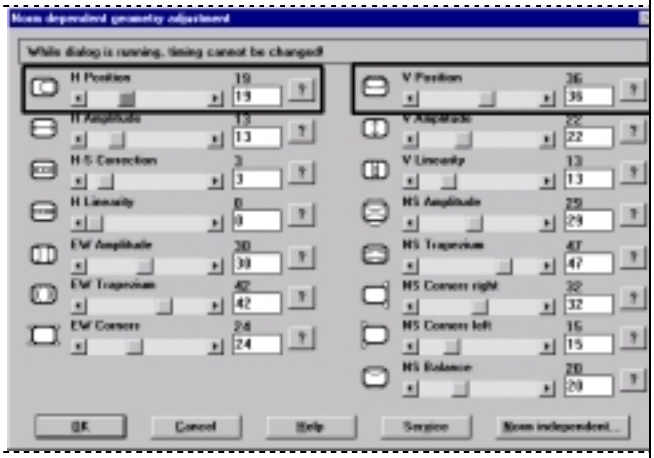
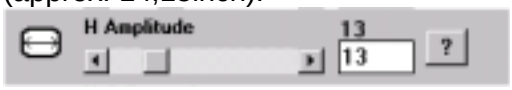
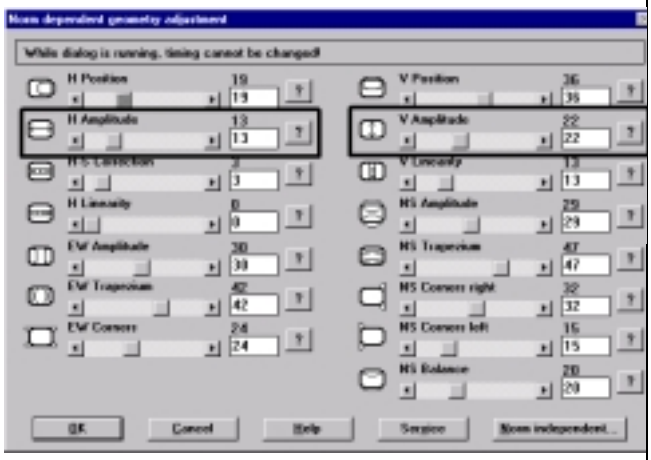
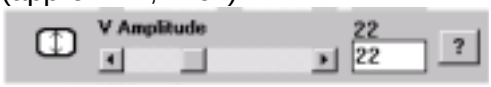
1. Adjustment of window width and height
2. Adjustment of brightness and contrast.

1.3.2 Aspect Ratio Adjustment

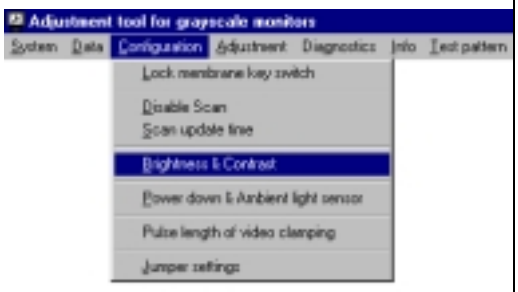
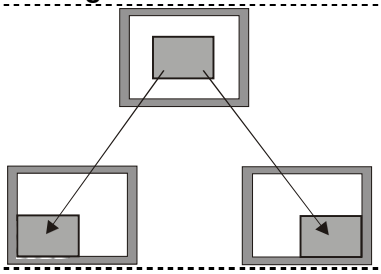
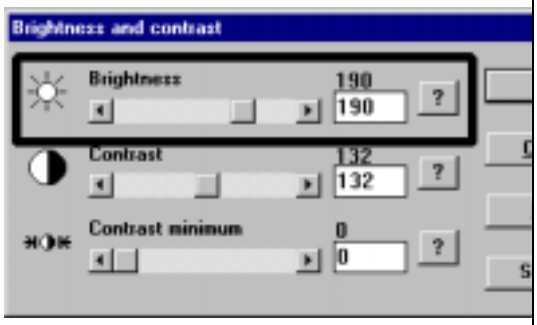
Requirements:

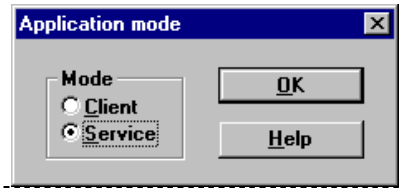
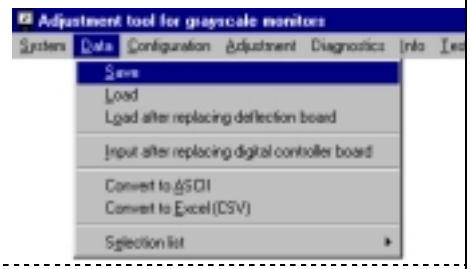
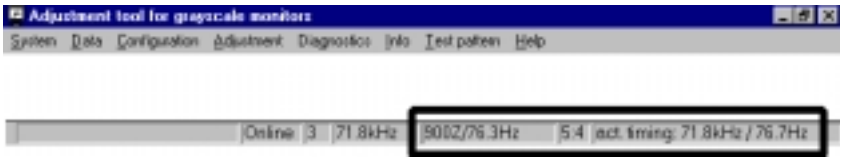
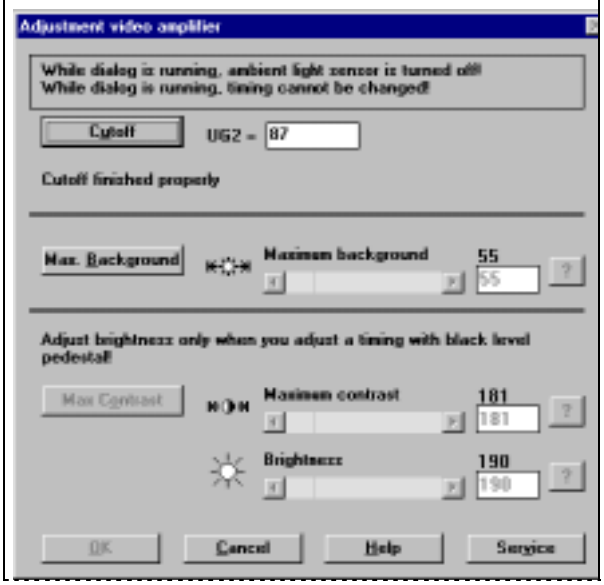
- Service PC with "SM-Fit" Application running
- ADC "Mimosa"- Application running
- Ruler to measure the screen width and height (ruler length about 40cm)

Step	Action
1	connect the service PC to the service port at the front of the monitor with a null modem cable.
2	run the „SM-Fit Grayscale“ application on your service PC.
3	select <service>-mode and press <OK>. 
4	type in the password **********. (if new: select the appropriate serial port)
5	put the floppy in the drive and save the current settings by selecting <Data>, <Save>. <u>File name:</u> The last eight digits of the serial number (on the rear side of the monitor).

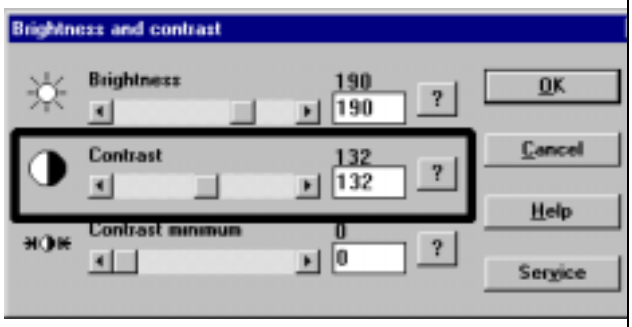
Step	Action
6	check in the bottom line of the screen, if the Vsync has a value of about 76Hz. If you encounter a difference of more than 10%, contact GSC!!  Adjustment tool for grayscale monitors System Data Configuration Adjustment Diagnostics Info Test pattern Help Online 3 71.8kHz 800Z/76.3Hz 5:4 act. timing: 71.8kHz / 76.7Hz
7	select in the Main Screen of SM-Fit <Adjustments>, <Geometry>  Adjustment tool for grayscale monitors System Data Configuration Adjustment Diagnostics Info Test pattern Help Geometry Video Amplifier Focus Ambient light sensor
8	move the application window with the sliders "H-Position" and "V-Position" to an exact centered position. 
9	adjust the screen width 36cm +/-1cm (approx. 14,15inch).  
10	adjust the screen height to 29cm +/-1cm (approx. 11,4inch). 
11	check the correct window position again by repeating step 8. If everything is well adjusted leave the menu „Geometry“ by pressing „OK“.
12	Save your modifications: click on Menu „data“ and select „save“.
13	if you do not want to adjust Brightness/Contrast, click on the menu „System“ and finally „Quit“.
14	disconnect Service – PC

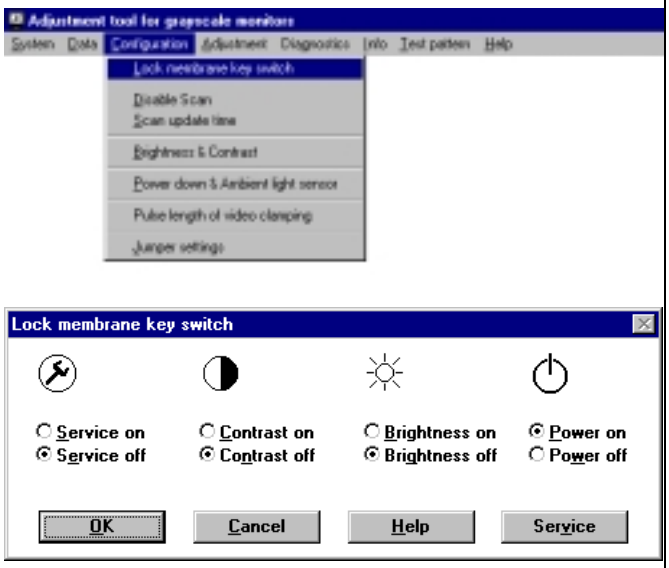
1.3.3 Calibration of Contrast and Brightness

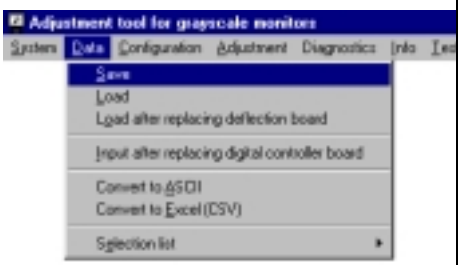
Step	Action
8	press the button wait until you get the message: „Cutoff finished properly“ (don’t worry the monitor luminescence changes) click on „Cancel“
9	select on the service PC in: <Configuration>, <Brightness & Contrast>. 
10	open a new window on the workstation and type in: **`xterm -bg black &`**
11	zoom the black window to fullscreen mode and shift it to one corner of the screen 
12	set the measuring range of the Mavo meter to 20cd/m²
13	set the brightness value for the black level in a way that you can recognize a <u>little</u> difference between the black level of your „black window“ and the black frame (tube background). Check light output of your black window . If you measure a value of <u>≤</u> 0,3 cd/m² the ambient light level is ok. Otherwise try to improve the ambient light conditions. Take care that the shadow cast by the casing of the monitor doesn’t affect the result. If it is impossible to display the little difference, refer to chapter 3.3.2 
14	create a white window with about 10x10cm and put it right in the center of the screen. xterm – bg white &
15	set the measuring range of the Mavo meter to 2000cd/m²

STEP	Action
1	connect the Service PC to the service port at the front of the monitor with a null modem cable.
2	run the „SM-Fit Grayscale“ application on your service PC.
3	select <service>-mode and press <OK>. 
4	type in the password ******. (if necessary select appropriate serial port)
5	save the current settings by selecting <Data>, <Save>.  Adjustment tool for grayscale monitors System Data Configuration Adjustment Diagnostics Info Test Save Load Load after replacing deflection board Input after replacing digital controller board Convert to ASCII Convert to Excel (CSV) Selection list
6	check in the bottom line of the screen, if the Vsync has a value of about 76Hz. If you encounter a difference of more than 10%, contact GSC!!  Adjustment tool for grayscale monitors System Data Configuration Adjustment Diagnostics Info Test pattern Help Online 3 71.8kHz 900Z/76.3Hz 5:4 act. timing: 71.8kHz / 76.7Hz
7	Select the menu <Adjustment> and <Video Amplifier>  Adjustment video amplifier While dialog is running, ambient light sensor is turned off! While dialog is running, timing cannot be changed! Cutoff UG2 = 87 Cutoff finished properly Max. Background Maximum background 55 Adjust brightness only when you adjust a timing with black level pedestal! Max Contrast Maximum contrast 181 Brightness 190 OK Cancel Help Service

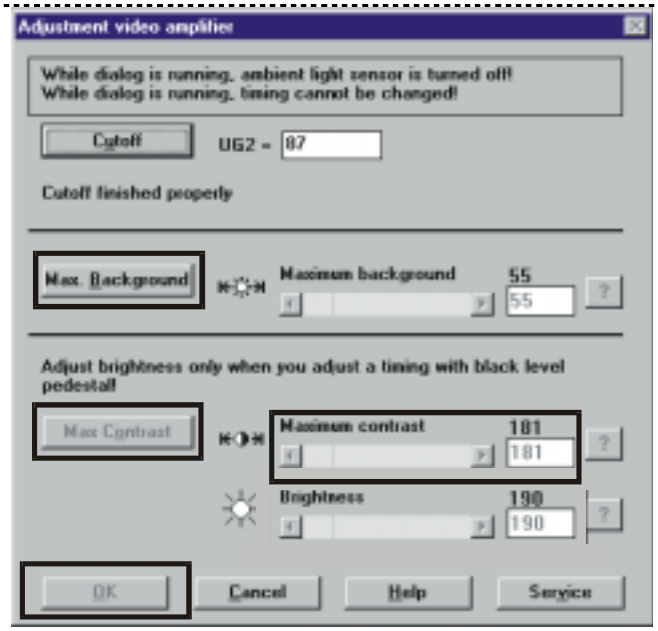
Step	Action
	⚠ Put the mouse pointer into your white window
16	set the light output value for the white level to 300 cd/m² with the slider bar <Contrast> press the „OK“ button to save the adjustments and leave the menu. ⚠ A light output value over 300 cd/m² reduces the lifespan of the monitor drastically. If you cannot reach 300 cd/m² refer to chapter 3.3.1
17	repeat the steps 11 to 16 at least 3 times to make sure, that the values of Brightness and Contrast are correct. This is necessary, because a change of one of these parameters also influences the others. Finally close your white and black windows.
18	check if the user control keys of the monitor are locked by selecting <configuration> <lock membrane key switch> and disable all user keys except "Power on". press „OK“
19	save the current settings by selecting <Data>, <Save>.
20	exit the SM Fit application by pressing the „System“ and „Quit“ button and then disconnect the service PC.





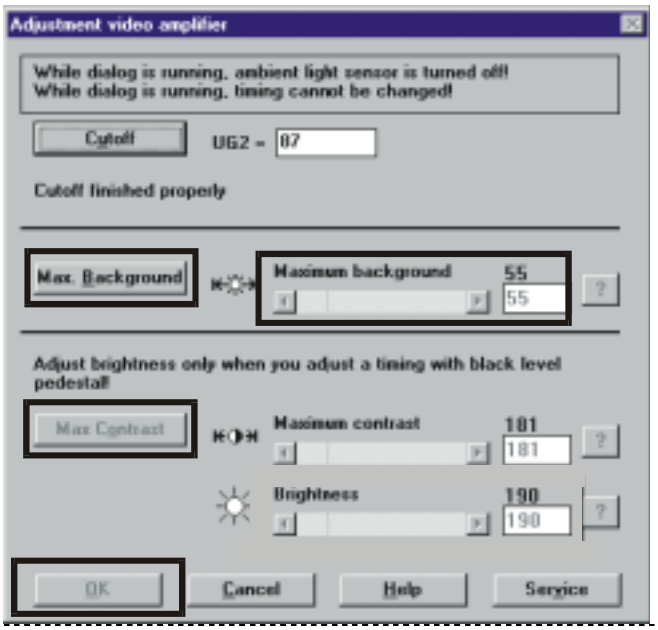


1.3.3.1 If you cannot reach the recommended max. monitor luminance density (300cd/m²), proceed as follows:

Step	Action
1	select on the service PC in: <Adjustment>, <Video Amplifier>
2	click on Max. Background click on the button „Max. Contrast“. increase the slider „Maximum contrast“ Select „OK“ to leave the menu. 
3	⚠ Adjust brightness and contrast again as described.

1.3.3.2 If you cannot reach the recommended min. monitor luminance density for the black level (0,3cd/m²):

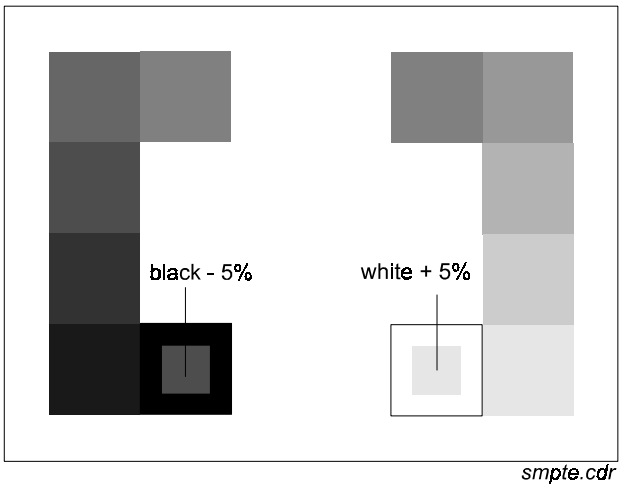
Step	Actions
1	Check, if the ambient light level is low enough
2	If the ambient light level is low enough, select on the service PC in: <Adjustment>, <Video Amplifier>
3	click on Max. Background
4	Increase the value of „Maximum Background“ slider.
5	click on „Max. Contrast“
6	click on „OK“
7	try again from topic 11 on (page 7). check correct adjustment of brightness and contrast



1.3.4 Final Check

- Display the SMPTE pattern:
  Press the <Open>-key and right mouse button simultaneously
  Select "Mimosa Maintenance"
  - Type in your password
  - select
    2 -Install-
    4 -Monitor-
    1 -SMPTE-
    3 -to load the SMPTE-pattern-.

  The 5% and 95% boxes must be correctly visible.



smpte.cdr

1.4 Calibration of the AGFA Standard Brightness Monitor

This calibration procedure takes appr. 30 minutes.
Calibration of the monitor is to be checked during maintenance of the ADC System.

Requirements:

- AGFA Standard Brightness Monitor, Order No.: EB+44060401 (without ambient light sensor).
- The monitor must be warmed up for at least 30 minutes.
- The monitor must be located and orientated where it will be used later.
- Ambient light as described in topic 1
- The ADC-Application must be running.
- Service PC with service software „Clinton“ and „User cont“ (available on Diginet).
- Light measuring tool, e.g. Mavo Digital Luminance Meter (Order No. CM+7.8966.1239.0), which is used in the following description. For different light measuring tools you have to proceed similar.
- Null-modem-cable (e.g. CM+9.9999.10180).
- floppy drive, empty floppy disk
- ruler (about 40 cm)

1.4.1 Installing the „Clinton“ software

- Insert Disk A in the floppy drive of your Service PC.
- Run <Setup.exe> and follow the instructions
- Copy "User_cont.exe" into your "Clinton"-folder.

To run the „User cont“ software, „Clinton“ must be previous installed! Please use for all adjustments in this section the Application "User cont"!

1.4.2 Overview

The calibration has to be done in 2 steps:

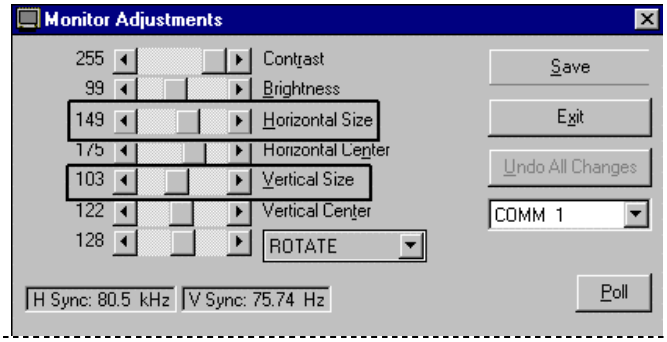
1. Adjustment of window width and height
2. Adjustment of brightness and contrast.

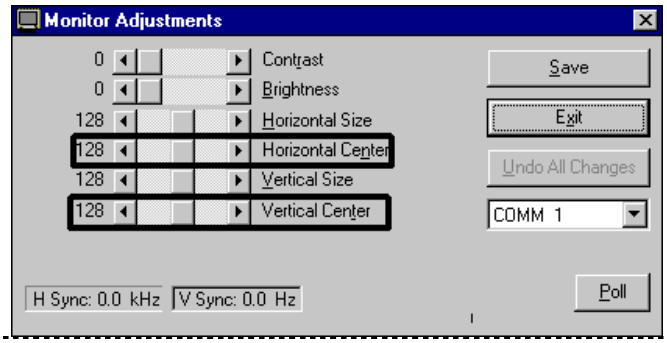
1.4.3 Aspect Ratio Adjustment

Requirements:

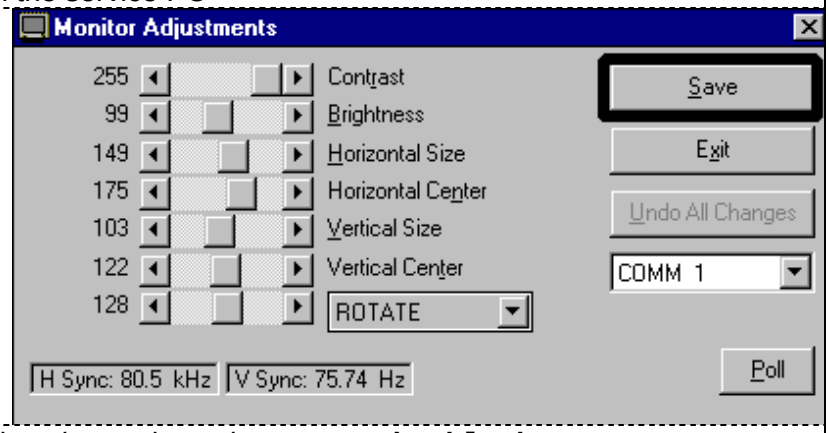
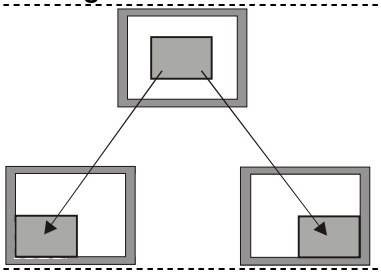
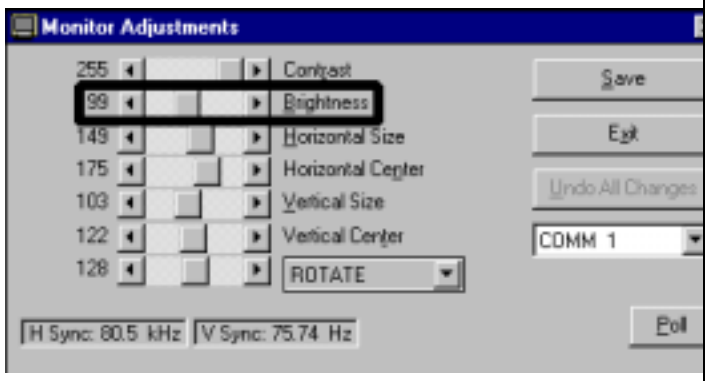
- Service PC with "User cont" Application
- ADC "Mimosa"- Application running
- Ruler to measure the screen width and height (length about 40cm)

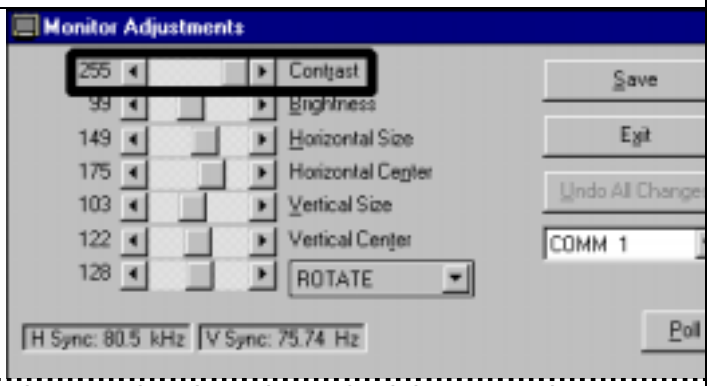
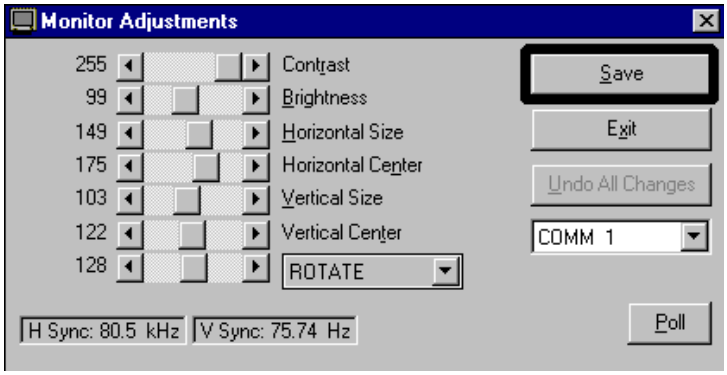
Step	Actions
1	connect your service PC to the service port of the Monitor by using a null modem cable.
2	Start the "User cont" Application
3	Adjust with the slider bar 149 Horizontal Size a screen width of 36cm +/-1cm (approx. 14,15")
4	Adjust with the slider bar 103 Vertical Size a screen height of 29cm +/-1cm (approx. 11,4" or a DIN A 4).
5	Move the application window with the sliders "Horizontal Center" and "Vertical Center" to an exact centered position.
6	Check the correct position again.
7	If you do not want to adjust Brightness/Contrast, click on the „Save“ and „Exit“ button and disconnect the service PC then.





1.4.4 Calibration of Contrast and Brightness

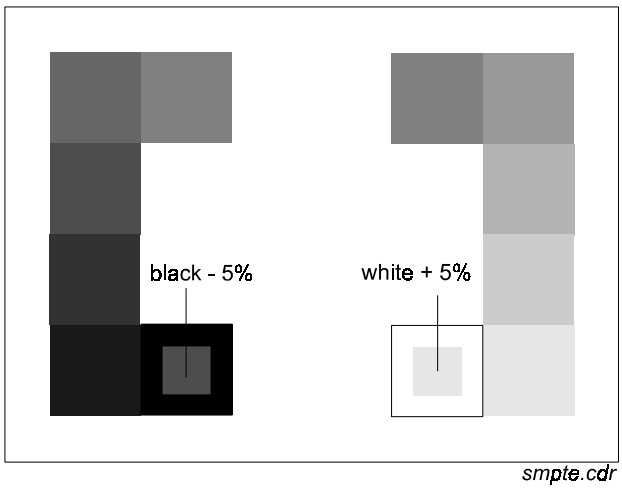
Step	Actions
1	run the „User Cont“ software on the service PC
2 3	Save the current settings by clicking on the <Save> button. Check V-Sync if it is less than 76 Hz± 10%, please call GSC. 
4	open a new window on the workstation and type in: **`xterm -bg black`**
5	zoom the black window to fullscreen mode and shift it to one corner of the screen 
6	set the measuring range of the Mavo meter to 20 cd/m².
8	set the light output value for the black level in a way that you can recognize a little difference between the black window and the black frame (tube background). . The shadow cast by the casing of the monitor doesn't affect the result Measure the luminance of your black window. If you have a value of ≤ 0,3 cd/m² the ambient light level is ok. If not, try to improve the viewing conditions. 
9	Create a white window with about 10x10cm and put it right in the center of the screen.
10	set the measuring range of the Mavo meter to 200 cd/m²

Step	Actions
11	set the light output value for the white level to 120 cd/m² with the contrast slider bar .  Monitor Adjustments 255 Contrast 99 Brightness 149 Horizontal Size 175 Horizontal Center 103 Vertical Size 122 Vertical Center 128 ROTATE Save Exit Undo All Changes COMM 1 H Sync: 80.5 kHz V Sync: 75.74 Hz Poll
12	repeat steps 6 to 12 at least 3 times to make sure that the values of Brightness and Contrast are correct. This is necessary, because a change of one of these parameters also influences the others.
13	save the new settings by clicking on the <Save> button  Monitor Adjustments 255 Contrast 99 Brightness 149 Horizontal Size 175 Horizontal Center 103 Vertical Size 122 Vertical Center 128 ROTATE Save Exit Undo All Changes COMM 1 H Sync: 80.5 kHz V Sync: 75.74 Hz Poll
14	to **lock** the user keys press the <Ctrl> <Shift> <L> keys simultaneously (to **unlock** the user keys press <Ctrl> <Shift> <U>).
15	check if the monitor keys except the power on/off-key are disabled.
16	click on the "Exit"-button and then disconnect the service PC.

1.4.5 Final Check

- Display the SMPTE pattern:
  - Press the <Open>-key and right mouse button simultaneously
  - Select "Mimosa Manintenance"
  - Type in your password
    2 -Install-
    4 -Monitor-
    1 -SMPTE-
    3 -to load the SMPTE-pattern-.

  The 5% and 95% boxes must be visible correctly.



smpte.cdr